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(54) Abstract Title
Apparatus for the euthanasia of young poultry

(57) The apparatus comprises a chamber (2) containing an anaesthetising and/or noxious gas in the lower part thereof, means (20) for feeding young poultry into an upper region of the chamber at a level above the anaesthetising and/or noxious gas, a plurality of generally horizontally arranged conveyor means (4, 6, 8, 10, 12) arranged substantially parallel beneath one another, and an inclined conveyor (24) for receiving euthanased young poultry from a discharge end of the lowest of the horizontally arranged conveyor means (12). The conveyor means may be provided such that one or more upper conveyors (4, 6) is located substantially above the upper level of the gas and one or more lower conveyors (8, 10, 12) is located within the body of the gas. The ends of the conveyor means are offset relative to each other and may have baffles (22). The inclined conveyor means (24) conveys the euthanased poultry to an outlet (18) in an upper region of the chamber (2) at a level above the gas. The conveyors may move at varying speeds. The gas may be CO_2 or argon or a mixture of both, the gas may be supplied by a manifold (32). A gas sensor (34) may be used to control the composition of the gas.

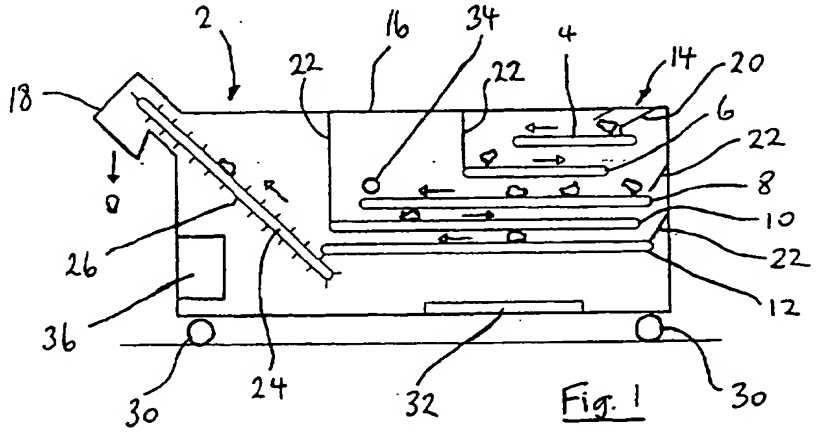

Fig. 1

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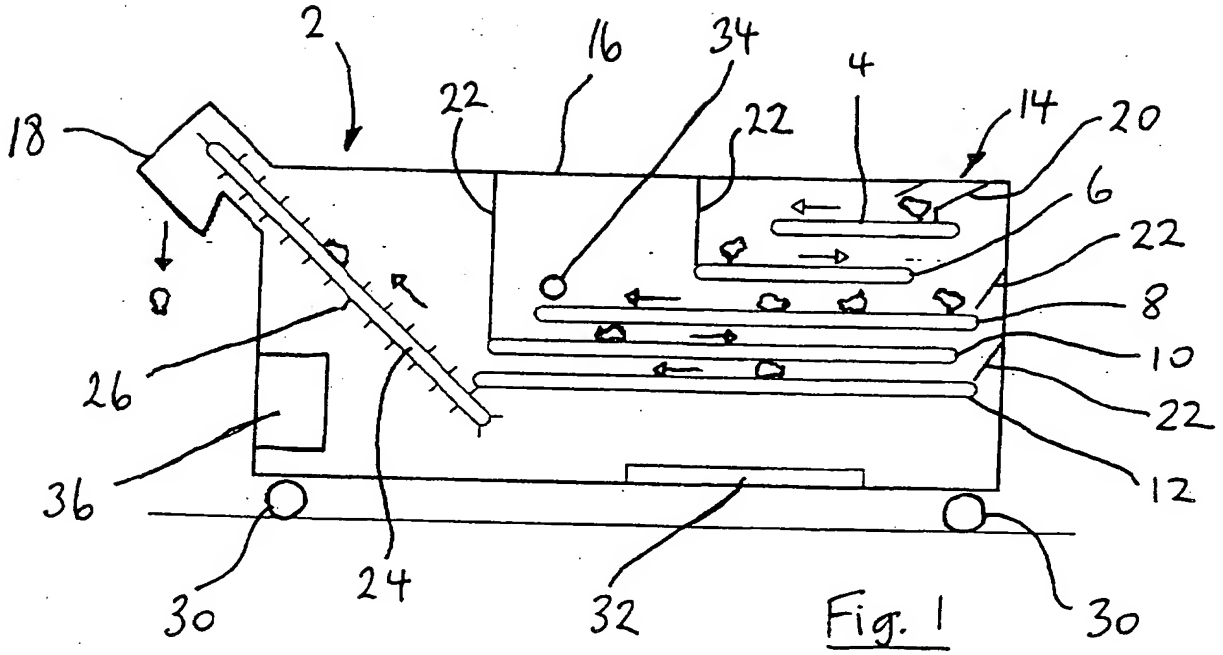

Fig. 1

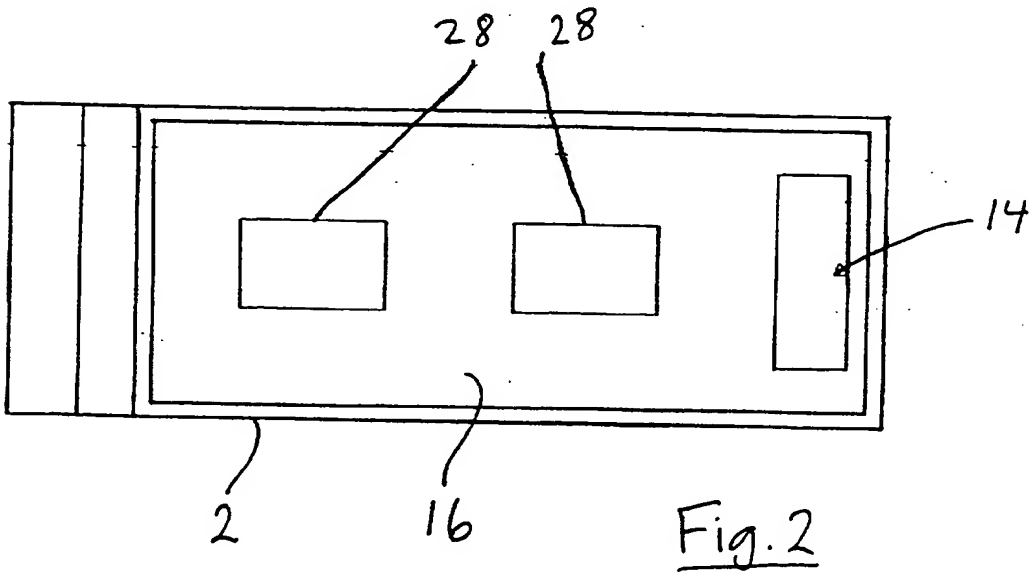

Fig. 2

TREATMENT OF YOUNG POULTRY

This invention relates to the treatment of young poultry, and more particularly relates to humane euthanasia of young poultry.

It is known to euthanase or stun grown birds by subjecting the birds to a treatment gas having an anaesthetic and/or noxious effect. To subject the birds to such treatment they are packed in crates which are lowered into a chamber containing the gas are retained therein for a predetermined duration before being removed once again.

Such a method is appropriate for grown birds which are relatively agile, but is unnecessarily complex for young birds, such as day-old chicks, ducklings and turkeys.

Day-old male chicks are of no value to hatcheries or egg producers and are consequently euthanased, often by mechanical means, in a manner such that the dead chicks are of no economic value. However, such chicks are in demand for feeding birds of prey and small carnivorous animals and could be used if they could be euthanased in a humane manner that causes no damage to the carcass or to an animal that might eat the carcass.

It is therefore an object of the present invention to provide an apparatus for the treatment of young poultry

which is effective for the humane euthanasia of such birds, but which does not involve either the complexities of corresponding apparatus for treating grown birds or damage to the resulting carcass.

According to the present invention there is provided an apparatus for the treatment of young poultry and comprising:

a chamber containing an anaesthetising and/or noxious gas in the lower part thereof;

means for feeding young poultry into an upper region of the chamber at a level above the anaesthetising and/or noxious gas;

a plurality of generally horizontally arranged conveyor means arranged substantially parallel beneath one another in a manner such that one or more upper conveyors is located substantially above the upper level of the anaesthetising and/or noxious gas and one or more lower conveyors is located within the body of the anaesthetising and/or noxious gas, the ends of the conveyor means being offset relative to each other such that the young poultry are discharged from a discharge end of one conveyor means onto a receiving end of the conveyor means below; and

inclined conveyor means for receiving euthanased young poultry from a discharge end of the lowest of the horizontally arranged conveyor means and for conveying the young poultry to an outlet in an upper region of the chamber at a level above the anaesthetising and/or noxious gas.

The feeding means may comprise an entrance provided in a top face of the chamber. The feeding means may include an inclined chute for delivering incoming young poultry onto the uppermost conveyor means.

The generally horizontal conveyor means may comprise belt conveyors.

One or two upper conveyor means may be provided at a level substantially above the upper level of the anaesthetising and/or noxious gas.

One, two or three lower conveyor means may be provided at a level to be located within the body of the anaesthetising and/or noxious gas.

The lower conveyor means may be longer than the upper conveyor means.

The lower conveyor means may move at a lower speed than the upper conveyor means.

The inclined conveyor means may comprise a lift conveyor. The lift conveyor may comprise a plurality of transverse separating members forming recesses therebetween.

The chamber may be in the form of a hood around the discharge end of the inclined conveyor means.

The anaesthetising and/or noxious gas may comprise carbon dioxide and/or argon containing not more than 2 percent by volume oxygen and preferably containing not more than 1 percent by volume oxygen.

The anaesthetising and/or noxious gas may comprise both carbon dioxide and argon. The two gases may be in separate layers, with the carbon dioxide layer being beneath the argon layer. The thickness of the carbon dioxide layer may be about twice the thickness of the argon layer.

The anaesthetising and/or noxious gas may introduced into the chamber through at least one manifold provided in a lower region of the chamber.

A gas sensor for controlling the composition of the anaesthetising and/or noxious gas may be provided at a level between the upper conveyors and the lower conveyors.

For a better understanding of the present invention and to show more clearly how it may be carried into effect

reference will now be made, by way of example, to the accompanying drawings in which:

Figure 1 is a side elevational view of one embodiment of a treatment apparatus according to the present invention; and

Figure 2 is a plan view of the apparatus shown in Figure 1.

The figures show a treatment apparatus for young poultry such as day-old chicks, ducklings, turkeys or the like and comprises a treatment chamber 2 having arranged therein a plurality of substantially horizontal belt conveyors 4, 6, 8, 10, 12.

The treatment chamber 2 is closed except for a generally rectangular entrance opening 14 in the top face 16 of the chamber in the region of one end of the chamber and for an exit opening 18 in the region of the opposite end region of the chamber.

The entrance opening 14 is provided with an inclined chute 20 which extends into the chamber 2 and which delivers incoming chicks onto a first, uppermost conveyor belt 4. The chicks travel along the belt 4 to the end thereof and are discharged therefrom onto a second, lower belt 6 which runs in the opposite direction to the first belt. In practice the second belt is substantially the same length as the first belt and extends beneath the first belt, but

is offset longitudinally of the first belt in order to receive the chicks discharged from the end of the first belt.

Beneath the first and second (upper) belts is a third belt 8 which runs in the opposite direction to the second belt. The third belt is longer than the second belt and extends in a longitudinal direction beyond the discharge end of the second belt to receive chicks from the second belt and also extends beyond the receiving end of the second belt for reasons that will be explained hereinafter.

Beneath the third belt 8 is a fourth belt 10 which runs in the opposite direction to the third belt. The fourth belt is substantially the same length as the third belt and extends beneath the third belt, but is offset longitudinally of the third belt in order to receive the chicks discharged from the end of the third belt.

Beneath the fourth belt 10 is a fifth belt 12 which runs in the opposite direction to the fourth belt. The fifth belt 12 is generally the same length as the fourth belt, but is in practice a little longer, and extends in a longitudinal direction beyond the discharge end of the fourth belt 10. Thus, the fifth belt 12 receives the chicks discharged from the end of the fourth belt 10. The fifth belt 12 terminates in a central region of the chamber 2 and discharges the chicks onto a lift conveyor 24 which

comprises a plurality of bucket-like recesses formed between upstanding separating members 26 which extend transversely of the conveyor 24. The lift conveyor 24 is upwardly inclined and lifts the chicks upwardly from the discharge end of the fifth conveyor 12 and itself discharges the chicks through the exit opening 18 into a box or the like (not shown) beneath the exit opening. The exit opening is in the form of a hood around the discharge end of the lift conveyor 24.

The chamber 2 is provided with two spaced observation windows 28 to enable an operator to observe and check the apparatus is functioning correctly. The chamber 2 is also provided with wheels 30 in the regions of the bottom corners thereof to facilitate movement and positioning of the chamber and to permit the apparatus to be portable.

The chamber 2 is provided with a supply (not shown) of an anaesthetising and/or noxious gas, such as argon and/or carbon dioxide. The gas or gases enter the chamber 2 through one or more manifolds 32 provided in the bottom of the chamber beneath the belt conveyors. Ideally, both carbon dioxide and argon are used as anaesthetising and/or noxious gases, with the carbon dioxide being in a layer beneath the argon. The thickness of the two layers is ideally in the region of 2 parts carbon dioxide to 1 part argon. The use of carbon dioxide in addition to argon has the benefit of significantly reduced costs. A gas sensor

34, such as an oxygen sensor, is positioned above the third belt and below the second belt to enable the composition of the anaesthetising and/or noxious gas and/or the presence or absence of oxygen in the atmosphere in the lower part of the chamber to be determined. A control panel 36 positioned externally of the chamber provides an analysis of the composition of the gas (or at least the oxygen content thereof) detected by the sensor 34 and also provides for control of the conveyors.

Baffles 22 are provided at the receiving end of each of the second, third, fourth and fifth belts to prevent the chicks falling off the end of the respective belt. The inclined chute 20 effectively acts as such a baffle for the first belt.

The chamber is made of a material that can readily be cleaned and disinfected, such as stainless steel. Such a material permits the interior of the chamber to be pressure washed. The bottom of the chamber is ideally slightly upwardly domed to assist drainage of cleaning fluid from the bottom of the chamber. The side walls and end walls may be provided with one or more access doors, which are provided with gas-tight seals, to facilitate cleaning of the apparatus.

In operation of the treatment apparatus, live young poultry, such as day-old male chicks produced in a hatchery

(not shown), enter through the entrance opening 14 and land on the first belt conveyor 4. They are carried along the first belt, fall off the end and onto the second belt, then pass from the second belt to the third belt, from the third belt to the fourth belt, from the fourth belt to the fifth belt and from the fifth belt to the lift conveyor and so exit the apparatus through the exit opening 18 and fall into a box or the like beneath the exit.

The composition of the anaesthetising and/or noxious gas within the lower part of the chamber below the sensor is controlled by means of the sensor 34 which in practice measures the concentration of oxygen. The anaesthetising and/or noxious gas is chosen to be heavier than air, such as argon or carbon dioxide, and therefore remains within the chamber despite the presence of the entrance and exit openings. The concentration of oxygen determined by the sensor 34 should be not more than 2 percent by volume and preferably not more than about 1 percent. The sensor 34 is connected to a visual display on the control panel and a controller is provided to inhibit operation of the conveyors in the event the concentration of oxygen determined by the sensor should rise above 2 percent (or 1 percent, for example). A proportional valve (not shown) is controlled in dependence on the concentration of oxygen detected to allow the anaesthetising and/or noxious gas to flow into the bottom of the chamber through the manifold 32 as required.

The two upper conveyor belts 4 and 6 travel at a faster speed than the three lower conveyor belts 8, 10 and 12, although the speeds of all the conveyor belts may be controlled within limits to control the rate at which the chicks are passed through the apparatus. The belts allow the chicks to be lowered into the anaesthetising and/or noxious gas relatively quickly while minimising turbulence in the surrounding atmosphere which could lead to loss of valuable gas or an excessive amount of oxygen in the atmosphere in the lower region of the chamber, and also minimising distress to the chicks.

The three lower belts move more slowly and also create minimal turbulence in the surrounding atmosphere, with the chicks largely being euthanased on the third belt. The fourth and fifth belts ensure the task is completed effectively and can be used to accumulate the euthanased chicks as they pass through the apparatus. The speed of the lift conveyor 24 determines the rate at which the chicks exit the apparatus. The speeds of the three lower belts is such that the chicks remain in the euthanasing atmosphere having not more than, for example, about 2 percent oxygen for at least 90 seconds and ideally for 2 to 2.5 minutes. Other types of poultry such as ducklings and turkey chicks can require a longer time, for example an additional 30 seconds, in the euthanasing atmosphere.

CLAIMS

1. An apparatus for the treatment of young poultry and comprising:

a chamber containing an anaesthetising and/or noxious gas in the lower part thereof;

means for feeding young poultry into an upper region of the chamber at a level above the anaesthetising and/or noxious gas;

a plurality of generally horizontally arranged conveyor means arranged substantially parallel beneath one another in a manner such that one or more upper conveyors is located substantially above the upper level of the anaesthetising and/or noxious gas and one or more lower conveyors is located within the body of the anaesthetising and/or noxious gas, the ends of the conveyor means being offset relative to each other such that the young poultry are discharged from a discharge end of one conveyor means onto a receiving end of the conveyor means below; and

inclined conveyor means for receiving euthanased young poultry from a discharge end of the lowest of the horizontally arranged conveyor means and for conveying the young poultry to an outlet in an upper region of the

chamber at a level above the anaesthetising and/or noxious gas.

2. An apparatus as claimed in claim 1, wherein the feeding means comprises an entrance provided in a top face of the chamber.

3. An apparatus as claimed in claim 1 or 2, wherein the feeding means includes an inclined chute for delivering incoming young poultry onto the uppermost conveyor means.

4. An apparatus as claimed in claim 1, 2 or 3, wherein the generally horizontal conveyor means comprises belt conveyors.

5. An apparatus as claimed in any preceding claim, wherein one or two upper conveyor means are provided at a level substantially above the upper level of the anaesthetising and/or noxious gas.

6. An apparatus as claimed in any preceding claim, wherein one, two or three lower conveyor means are provided at a level to be located within the body of the anaesthetising and/or noxious gas.

7. An apparatus as claimed in any preceding claim, wherein the lower conveyor means is longer than the upper conveyor means.

8. An apparatus as claimed in any preceding claim, wherein the lower conveyor means moves at a lower speed than the upper conveyor means.

9. An apparatus as claimed in any preceding claim, wherein the inclined conveyor means comprises a lift conveyor.

10. An apparatus as claimed in claim 9, wherein the lift conveyor comprises a plurality of transverse separating members forming recesses therebetween.

11. An apparatus as claimed in any preceding claim, wherein the chamber is in the form of a hood around the discharge end of the inclined conveyor means.

12. An apparatus as claimed in any preceding claim, wherein the anaesthetising and/or noxious gas comprises carbon dioxide and/or argon containing not more than 2 percent by volume oxygen.

13. An apparatus as claimed in claim 12, wherein the anaesthetising and/or noxious gas contains not more than 1 percent by volume oxygen.

14. An apparatus as claimed in claim 12 or 13, wherein the anaesthetising and/or noxious gas comprises both carbon dioxide and argon.

15. An apparatus as claimed in claim 14, wherein the two gases are in separate layers, with the carbon dioxide layer being beneath the argon layer..

16. An apparatus as claimed in claim 15, wherein the thickness of the carbon dioxide layer is about twice the thickness of the argon layer.

17. An apparatus as claimed in any preceding claim, wherein the anaesthetising and/or noxious gas is introduced into the chamber through at least one manifold provided in a lower region of the chamber.

18. An apparatus as claimed in any preceding claim, wherein a gas sensor for controlling the composition of the anaesthetising and/or noxious gas is provided at a level between the upper conveyors and the lower conveyors.

19. An apparatus for the treatment of young poultry substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.

INVESTOR IN PEOPLE

Application No: GB 0109332.7 15 **Examiner:** Paul Jenkins
Claims searched: 1-19 **Date of search:** 7 September 2001

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.S): A1M (MDE)

Int Cl (Ed.7): A22B 3/00, 3/08, 7/00

Other: Online: WPI, EPODOC, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
A	GB 2285906 A	(ANGLIA)	-------
X	JP 02031638 A	(NIPPON SANSO) See WPI & PAJ abstracts and the figure	1-6 & 12
A	FR 2623058 A1	(AUBERT)	-------

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
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